22587

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3 Hours / 70 Marks   Seat No.

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   Attempt any FIVE of the following: **10**

a) State functions of range sensor.

b) List various methods of robot programming.

c) Classify end effectors.

d) State the types of robot maintenance.

e) State any four End effector commands.

f) List various future technologies of robot.

g) State functions of force sensor.

Marks

2. **Attempt any THREE of the following:** 12

   a) Sketch symbol of various joints used in robotic systems.

   b) Explain edge detection and its procedure.

   c) Write short note on teach pendant.

   d) Explain applications of Robot in spot and continuous arc welding.

3. **Attempt any THREE of the following:** 12

   a) State various capabilities and limitations of lead through programming methods.

   b) Enlist chronology of development related to robot technology.

   c) Explain various applications of Robots in manufacturing industries.

   d) State standard notations symbols used for various joints.

   e) Explain future mechanical design features may use in robots.

4. **Attempt any THREE of the following:** 12

   a) State the need of telepresence and related technologies.

   b) Explain applications of Robot in automated assemblies.

   c) Using VAL language, discuss the basic commands and explain the structure of the program for a typical pick and place operation.

   d) Explain feature extraction techniques.

   e) Discuss advantages and disadvantages of using robots in industry.

5. **Attempt any TWO of the following:** 12

   a) Explain applications of Robot in automated assemblies.

   b) Write program for inspection of bolt. (Assume all necessary dimensions.)

   c) Explain system integration and networking approach may use in robot.

6.   **Attempt any <u>TWO</u> of the following:**   **12**

   a)   What is edge detection and explain the procedure?

   b)   Write VAL program for inspecting an OBJECT into a box by approaching 45 mm above the object by moving to an intermediate point 'P' along a straight line and approaching the box 70 mm from above and finally setting the gripper 25 mm above the box.

   c)   Explain different robot components.

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